Prototyping

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“Humans are really interesting. If you show them your idea in a prototype form, very few people will tell you what’s right about it. But everybody will tell you what’s wrong with it.”
Prototyping
The process of creating usable artifacts at a variety of fidelities of completion, in order to answer design questions and communicate design ideas; with users in the context of use.
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Fidelity – The level of detail, completion, or polish that is required to communicate a concept.
Prototyping
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Or check our design assumptions!
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The people that will ultimately be using the final product.
Prototyping
The process of creating usable artifacts at a variety of fidelities of completion, in order to answer design questions and communicate design ideas; with users in the context of use.

The environment and or conditions in which the person will be using the final product.
Prototyping

AESTHETICS

FUNCTIONALITY

- Digital Prototypes
- Physical Prototypes
Digital Prototyping

AESTHETICS

- Archetype Screen (Comp)
- Archetype Screen (Wireframe)
- Sketching

FUNCTIONALITY

- Digital Prototypes
- Paper Prototype (Wireframe)
- Paper Prototype (Comp)
- Click-able Wireframe
- Click-able Comp
- Simulation
- Digital Prototype
Digital Prototyping

Sketches

Checkout Flow | BethanyStolle

1. Place Your Order
   Individual Coaching Initial Assessment
   \[ \text{Price: } $100 \times \text{items} = \text{Total: } $100 \]

2. Client Information
   Name: [ ]
   Organization: [ ]
   Address: [ ]
   City: [ ]
   State: [ ]
   Zip: [ ]
   Phone: [ ]
   Email: [ ]
   Same as billing address: [ ]

3. Payment
   - credit card
   - check
   - payment plan
   Card number: [ ]
   Expiration: [ ]
   Security code: [ ]

4. Total
   $100

Now What?

1. Request appointment
   - 10/22
   - 1:30pm - 5:30pm
   - 7:30pm - 9:30pm
   - 10/23
   - 7:30am - 10:30am

2. Check your email
   Bethany will follow up within 48 hours to confirm your appointment.

3. Review the coaching manual
   [download manual]
Digital Prototyping

Wireframe

Boardwalk Empire

- 106 HBO  Sunday's 7:00pm

Moments of Impact

- 112 KVCA  Thu, Dec 16, 7pm

Inside the NBA

- 108 TNT  Every Day 10:00pm

Front Row (7)

- 3 KNTV

Trading Spaces

- 1102 HDT  Wednesday's 10:00pm

Pokerstars.net

- 5 KPIX  Every day

Law&Order: SVU (14)

- 3 KNTV  Every day 5:00pm

Family Guy

- 253 Front

Boardwalk Empire

Enos "Nucky" Thompson and other organized crime figures rule over Prohibition-era Atlantic City and attempt to avoid or neutralize rival gangsters and interested law enforcement investigators.

The Emerald City

Nucky asks Margaret to toe the party line. Angela witnesses Jimmy's violent side; Capone faces a crossroads; Van Alden struggles with his emotions.

Recording Scheduled: Sunday - 7pm
106 HBO

A Return To Normalcy

Nucky and Atlantic City brace for change on Election Day; Jimmy brokrs a deal between two nemeses, with far-reaching consequences.

Another Episode

Nucky and Atlantic City brace for change on Election Day; Jimmy brokrs a deal between two nemeses, with far-reaching consequences.

Browser TV  Guide  On Demand  Recordings  Library
Digital Prototyping

AT&T | U-verse for Tablet

Boardwalk Empire
HBO: Season 1, Sun 7PM ET

A Return To Normalcy
A small river named Duden flows by their place and supplies it with the needed regella. It is a paradigmatic country, in which roasted parts of sentences fly into your mouth.
Task: Access the product details of product #1431 and confirm the vendor’s material selection.

Step 1
User is on the Dept home page
User “clicks” product category

Step 2
Product category is displayed

Step 3
User “clicks” a product to see the product details page

Step 4
The product details page is displayed. The user confirms the vendor’s material selection.
Digital Prototyping

Low Fidelity Prototypes:
Allow for rapid iteration & “on the fly” customization

Archetype Screen (Comp)
Archetype Screen (Wireframe)
Sketching
Paper Prototype (Comp)
Paper Prototype (Wireframe)
Click-able Comp
Click-able Wireframe
Simulation
Digital Prototype

FUNCTIONALITY

AESTHETICS

Digital Prototypes
Digital Prototyping

Click-able Comp

Boardwalk Empire
HBO: Season 1, Sun 7PM ET
A Return To Normalcy
A small river named Duden flows by their place and supplies it with the needed regalia. It is a paradisematic country, in which roasted parts of sentences fly into your mouth.

Record
Boardwalk Empire
Sunday - 7pm

Record Episode
Record Series

The Emerald City
This is a block of desc

A Return To Normalcy
This is a block of desc

A Previous Episode
This is a block of desc

More Showtimes
More Options

ac4d
Digital Prototyping

Medium Fidelity Prototypes: Allow for rich interactive experiences without the overhead of production code.
Physical Prototyping

AESTHETICS

FUNCTIONALITY

Sketching

Form Model

Ergonomic Model

Aesthetic Model

Functional Mockup

Functional Proof of Concept

High Fidelity Functional Prototype

Physical Prototypes
Physical Prototypes

Engineering Sketches

Closure
Bottle
Fitment
Physical Prototypes

Function Sketches
Physical Prototyping

Form Sketches
Physical Prototypes

Form / Ergonomic Model

ac4d
Physical Prototypes

Ergonomic Model
Physical Prototypes

Form Model
Physical Prototyping

AESTHETICS

Low Fidelity Prototypes: Allow for rapid iteration & “on the fly” customization

FUNCTIONALITY

Physical Prototypes

Form Model

Ergonomic Model

Aesthetic Model

High Fidelity Functional Prototype

Functional Mockup

Functional Proof of Concept

Sketching
Physical Prototypes

Aesthetic Model
Physical Prototyping

AESTHETICS

Medium Fidelity Prototypes: Allow for rich interactive experiences without the overhead of manufacturing

FUNCTIONALITY

High Fidelity Functional Prototype

Ac4d
Physical Prototyping

AESTHETICS

- Sketching
- Digital Prototypes
- Form Model
- Ergonomic Model
- Aesthetic Model

FUNCTIONALITY

- Functional Mockup
- Functional Proof of Concept
- High Fidelity Functional Prototype

Higher Fidelity = Decreased speed of Iteration
What is the appropriate level of fidelity? The level of fidelity that allows you to test what’s important while maximizing the number of possible iterations.

With most prototypes, the level of fidelity can be relatively low. People are naturally good at using their imagination to fill in the details.
Start with Low Fidelity Prototypes
These prototypes are extremely useful as they can be made quickly, changed without repercussions, and often elicit better feedback (users are not worried about hurting the designers’ feelings).
Creating Physical Prototypes

1. **Who you are solving a problem for?**
   - Who is the primary user of the product, system or service?
   - Does this person have any physical or cognitive disabilities?
   - What is the context of use for the product (where is the user when they are using this product? Does the use only happen in certain circumstances?)
   - Is there another primary, or secondary actor?

**For Example:**

**Drone Pilot**  
Might need to accomplish familiar tasks while using a new set of controls.  
Has a limited viewing screen for all sight lines and forms of system feedback.

**Elderly Person**  
Might not be able to see font under 16pt  
Or do any task requiring manual dexterity.
Creating Physical Prototypes

2. **What goal is the user trying to accomplish?**

   Use cases are a great place to start when outlining the user’s goal. Write a statement that captures the user’s goal, the context of use, and any associated constraints or considerations.

   **For Example:**

   **Drone Pilot**
   Needs to be able to locate targets through the camera, maintain visual contact with targets while engaging, and keep control of the aircraft.

   **Elderly Person**
   Needs to locate their medication within a shared box of medication, confirm it’s the right one, and then take the pill – all without getting their glasses.
3. Loosely sketch a variety of forms, control surfaces, etc. that would allow the user to accomplish their goal. Try to come up with 2 – 3 different versions of the same thing, such that performing the task with each version will be noticeably different.

Start with overarching concepts – like form, visual differentiator, or control placement – and then add a few details. If your goal requires a sequence of actions, try to sketch these in as limited sequence as possible. Refer to your storyboards for the appropriate sequence.
Creating Physical Prototypes

4. Using low fidelity materials, create a prototype of each of your sketches that will allow users to accomplish the task. Note: you may also need to construct part of the “context of use” out of these materials as well.

- Start with creating primary shapes with common materials – Cardboard, foam core & hot glue.
- For form studies, use pink insulation foam from home depot (spray adhesive can be used to hold layers together. Use a rasp and sand paper to carve the form).
- For screens / interfaces, use paper print outs – Multiple print outs can be used if the user needs to interact with the system.
Creating Physical Prototypes

4. Using low fidelity materials, create a prototype of each of your sketches that will allow users to accomplish the task. Note: you may also need to construct part of the “context of use” out of these materials as well.

For Example:

Drone Pilot
Needs to be able to locate targets through the camera, maintain visual contact with targets while engaging, and keep control of the aircraft.

Build:
• Some form of cockpit – with Velcro stickers (allows user to move controls around as needed)
• Primary controls – Cardboard tubes?
• A panel with the appropriate secondary controls
• A print out of the screen(s) that they might see as they complete the task

Elderly Person
Needs to locate their “Every 2 hour” medication within a shared box of medication, confirm it’s the right Rx, and then take the pill – all without getting their glasses.

Build
• 2-3 foam shapes that test the best shape for gripping – use a rasp and pink foam
• 2 – 3 Rx Labels for each foam shape to test the placement of Prescription information - with varying size fonts
• Hick’s law*
Hicks’ law
With every additional choice, the time it will take for one to make a selection increases.

When prototyping products, systems, and services, Less = More. Try to prototype the variables that need the most attention or are vital to the user achieving their goal.
Creating Physical Prototypes

5. Test your prototypes with 2 or 3 users in the context of use (or as close to it as possible):
   - Ask the user to imagine that they are in the appropriate context (in the bathroom taking medication, or in the cockpit of an airplane).
   - Tell they user they are going to be completing a familiar task with your prototype – tell them the task.
   - Provide the prototype, and the task on a piece of paper, and ask them to walk you through the act of performing it.
Creating Physical Prototypes

6. While Testing:

- RECORD EVERYTHING – with more than one recording device (video or audio, and camera)
- Have one person dedicated to taking notes and one person dedicated to taking photos or video.
- Ask the user to talk as much as possible while performing the task
**After Testing**

Review your notes, video, and audio – capture each point of failure, for each user, on a post-it.

Failure: If they expressed surprise, made a design suggestion, or anything else that prevented them from completing the task.

User 1  User 2  User 3

![User 1](image)

![User 2](image)

![User 3](image)
After Testing
Organize these post-its into groups or themes, where themes represent a set of failures that have something in common.
After Testing
Using a different color post-it, label the theme for each group.
After Testing
Refine your designs and prototypes so that they “solve” the problem. Repeat the process until they actually do.
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Download our free book,
Wicked Problems: Problems Worth Solving,
at http://www.wickedproblems.com